


Selected Forestry Infomart Products and Impacts

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The following table provides an outline of some products developed and impacts from those products. Expanded explanations for selected products follow the table.

Success/Product	Impact/Metric
Forest Gap Analysis for Cumberland Plateau for World Wildlife Fund completed using 30-m land cover data and other GIS layers; identified HCV forests by subsection; first comprehensive, regional evaluation of HCV forest at moderate (as opposed to coarse) resolution	Data adopted by WWF as a guide for sustainable forestry in the region to conserve biota; promises to impact forest certification (the certification that lumber is produced following best management practices; retailers such as Home Depot and Lowe's sell only certified lumber), public forest management, and possibly private forest management
Tool for setting priorities for HCV forest developed based on land cover data in combination with other GIS data on conservation targets; algorithm refined and HCV forests priorities set for 10 ecological subsection in the Ozark Highlands; results represent first moderate resolution data layer to address identification of HCV forests in region	Tool adopted by US EPA, Region 7, for use in planning, policy, and permit review. Once finished across the entire 4-state region, this data layer will be used as a key input for ecosystem state and environmental risk assessments upon which EPA, and by extension sister state agency, policy will be set in the Midwest; it will also be used in the forest plan revision by the USFS, Mark Twain National Forest
Land cover completed for 25% of Missouri using ETM+ triplicates; data made available to partners and product will be used for planning & policy	Multi-agency land cover subcommittee actively involved in data layer production; data will be adopted as standard by federal and state agencies in Missouri for a wide range of natural resource planning; the circa 1992 land cover we provided is in wide use by multiple agencies and this represents the up-date
Tested two methods for detecting subtle changes in forest health and selected one (stacking wetness component from tasseled-cap transformation); results represent a way to monitor forest health and detect drought, insect, or disease impacts – a first for Midwest hardwood forests	Broad implications for monitoring of forest health; the tool will be adopted by the USFS and Missouri Department of Conservation (MDC), who have helped develop it, as a standard for proceeding to accomplish change detection/forest health monitoring across a broad swath of the Ozarks and possibly beyond
Successfully implemented BGC++ productivity model for a central hardwood forest (Ozark Highlands) for the first time, and evaluated 1-km MODIS NPP outcomes as a quality check; all data evaluations were applied to real-world forest stands supplied by USFS	USFS will use these results in revision of their 10-year forest plan, especially in regard to adjusting forest stand composition based both on maximizing productivity and increasing forest health (from the previous product); MDC also involved in forest planning with these products; offers promise for extending MODIS utility by adding aboveground NPP and stem increment

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	values to MODIS standard NPP (these variables are more important to forestry but not now available)

Remote Sensing for Resource Assessment and Forest Health Monitoring.

The land cover data layer we produced using circa 1992 TM data served as the basis for a variety of important statewide natural resource assessments in Missouri. Among them were the ranking of watersheds for overall environmental quality by the Natural Resources Conservation Service, the production of statistics for Regional Management Guides by the Missouri Department of Conservation, the production of metrics for ranking ecoregions for overall environmental quality by EPA, and the production of metrics for watershed analyses and ranking by the Mark Twain National Forest. However, partners need up-to-date land cover for future similar analyses, and our current efforts to up-date the land cover data using ETM+ data will be much anticipated by many partners. The monitoring of forest and forest health has been of particular concern to a number of partners, especially the Mark Twain National Forest and the Missouri Department of Conservation, both of which own and manage lands with significant forest resources in the Ozarks. The perception of managers has been that impacts of drought, insect pests, and oak decline (a fungus or perhaps several fungi species) have had a creeping, hard to monitor, impact on forests of the state. The reasons may be several fold, but may include the spread of invasive insect pests from the east; unusual drought conditions; the aging of the forests since massive harvests in the 1920's; and the presence of oak stands on site types that better support pines or pine-oak forests. Working with USFS and MDC personnel, we have worked out methods to identify minor changes in forest health using a time series of TM and ETM+ data that can be checked by on-the-ground workers to help identify the causes of forest health stress and ultimately to mitigate the impacts of these stressors. This represents an entirely new tool for monitoring of forest health. Workers on the ground cannot monitor the large areas that need to be covered, and also have trouble identifying problems due to a lack of perspective in terms of context (e.g. is stress seen in one stand similar to stress on other, similar stands, or is it unusual). Much work still needs to be done, but current efforts appear promising, and may have a significant impact on forest management via identification of stands that are chronically stressed because the composition is inappropriate for the site type (e.g. an oak stand that needs to be converted to more drought-tolerant pine) or newly stressed (e.g. due to insect pests or oak decline).

Data Products for Use in Planning for Conservation and Development.

We formed an interagency conservation opportunity area committee to oversee the development of information to facilitate a variety of planning efforts. The key question for partners such as the EPA, US Forest Service, Missouri Department of Conservation, World Wildlife Fund, and American Bird Conservancy is how to identify and rank specific areas on the ground in terms of their importance to natural resource conservation. Each different end user has a different idea of what are the most important conservation targets. For example, the EPA is interested in overall environmental integrity, including biological diversity, rare elements, and factors that impact air and water quality; the American Bird Conservancy is mainly interested in target bird species; and the Missouri Department of Conservation is interested primarily in rare elements. Thus, it is important to define methods that are flexible enough to serve a variety of partners with slightly different points of view. We developed a method for identifying large patches of natural and semi-natural vegetation using land cover and roads data layers, and then developed data on a variety of conservation targets so these conservation opportunity areas could be ranked. Importantly, our results are provided at a 30-m



spatial resolution, which can be of practical use to managers and planners on the ground, in contrast to existing, coarser-resolution analyses by whole watersheds or ecoregions.

The American Bird Conservancy used results to help define priority bird conservation areas for their Central Hardwoods Bird Conservation Region effort. We presented our data at a series of three regional meetings attended by biologists and land managers, and examined scenarios for action on-screen using GIS in an interactive way. The Missouri Department of Conservation used our results to facilitate the production of ten Regional Management Guide books that serve as the basis for regional planning for wildlife conservation in the state. Finally, EPA's Region 7 in Kansas City has designated the protection of critical ecosystems as one of three regional priorities. The overarching goal of the initiative is to identify, improve, and protect ecosystems that are critical to biodiversity, human quality of life, or landscape function. Implementation of conservation measures on the ground requires a much finer-resolution analysis than is currently available, so that actions can be applied in the kind of site-specific activities that EPA programs conduct. Thus, EPA has supported the development of the OA approach, and refined OA analysis results will be used both in building a set of decision support tools for EPA program staff and in targeting ecosystem-specific projects throughout the region.